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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/716,316

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Xiaochun Nie

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EXAMINER

WERNER, DAVID N

ART UNIT

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/716,316	<b>Applicant(s)</b> NIE ET AL.	
	<b>Examiner</b> David N. Werner	<b>Art Unit</b> 2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 September 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,5,16,20 and 22-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,15,16,20 and 22-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)         | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

### DETAILED ACTION

1. This Office action for U.S. Patent 10/716,316 is responsive to the Pre-Appeal Brief Conference Request filed 29 September 2009. Claims 1, 15, 16, 20, and 22–27 are pending.

In the Final Rejection of 29 May 2010, Claims 1 and 22–27 were rejected under 35 U.S.C. 103(a) as obvious over U.S. Patent No. 7,079,581 B2 (*Noh*) in view of U.S. Patent No. 6,226,326 B2 (*Mihara*). Claims 15, 16, and 20 were rejected under 35 U.S.C. 103(a) as obvious over *Noh* in view of *Mihara* and in view of U.S. Patent 5,650,860 A (*Uz*).

2. In view of the Pre-Appeal Brief Conference Request filed on 29 September 2009, PROSECUTION IS HEREBY REOPENED. New grounds of rejection under 35 U.S.C. § 102(b) and 35 U.S.C. § 103(a) are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth

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in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below:

/Mehrdad Dastouri/

Supervisory Patent Examiner, Art Unit 2621

### ***Response to Arguments***

3. Applicant's arguments, see pp. 1–2, filed 29 September 2009, with respect to the rejection(s) of claim(s) 1 under 35 U.S.C. § 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of U.S. Patent No. 5,801,779 A (*Uz*).

In the Final Rejection, the examiner mapped equation (5) of *Noh* with the claimed method of "scaling a bit budget", with R interpreted as a bit budget that is calculated as a function of the material on the right side of the equation. However, as Applicant correctly states in the "Remarks for Request for Pre-Appeal Conference", this is not a calculation of the value of R. Instead, R is already calculated "by dividing the quantity of an overall bit by the number of P frames to be encoded". *Noh*, col. 5: lines 64–67. Equation 5 actually determines the values of parameters X1 and X2 based on R. *Id.* at col. 5: line 67 – col. 6: line 1.

It is respectfully submitted that U.S. Patent No. 5,801,779 A (*Uz*) unambiguously discloses a process of scaling a bit budget from a decoder buffer, as will be shown in more detail below.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 15, 16, 20, 23, and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,801,779 A (*Uz*). *Uz* discloses a rate control system for a video encoder with a plurality of rate control modes: a normal mode in which a bit budget is allowed a relatively relaxed range, and a panic mode in which the bit budget is tightly maintained.

Regarding Claim 1, in *Uz*, a bit budget BBi is calculated for each frame in a video sequence based on the number of bits to encode the previous frame of the same type and the average quantization scale factors for previous frames. *Uz*, col. 4: line 64 – col. 5: line 5. The bit budget is updated based on a virtual buffer verifier (VBV) occupancy level to prevent decoder overflow or underflow. *Id.* at col. 5: lines 28–30. In particularly dire situations, a rate control module initiates a "panic mode" which changes image quality to place the bitstream rate back into a normal level. *Id.* at col. 5: lines 31–39. A normal mode and a panic mode may be considered the claimed plurality of relaxation

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levels, with a flag for a panic mode as the received value identifying a relaxation level.

*Id.* at col. 14: lines 44–48. As shown in figure 8A, the bit budget is scaled during a panic mode to bring the VBV fullness back within an acceptable range as quickly as possible—including clipping in case of VBV overflow or a drastic scaling in case of VBV underflow. These changed scalings during a panic mode are examples of the claimed scaling relationships that correspond to relaxation levels associated with the panic mode. The claimed "scaled bit budget" is the one that is updated according to a VBV buffer occupancy level, or clipped in case of a panic mode. *Id.* at col. 5: lines 28–39. The video frame is then encoded with the new bit budget. *Id.* at col. 24: lines 6–7. This is the claimed step of "encoding the current video frame using the final bit budget". The entire rate control algorithm is performed in a pipelined rate control module in an encoder. *Id.* at fig. 9, col. 23: line 7–column 24: line 8.

Regarding claim 15, in *Uz*, the claimed "initial bit budget" is the bit budget for the frame shown in equation 1 (col. 13: line 15), and the panic mode flag signaling an imminent overflow or underflow (col. 14 lines 44–48) is the claimed "relaxation control value". The scale value based on the percentage of memory buffer space used, or VBV fullness, is the ratio between the dotted line (desired bit budget) and solid line (actual bit budget) in Figure 8A. The claimed "final bit budget" is the one that is updated according to a VBV buffer occupancy level, or clipped in case of a panic mode. *Id.* at col. 5: lines 28–39. The video frame is then encoded with the new bit budget. *Id.* at col. 24: lines 6–7. This is the claimed step of "encoding the current video frame using the final bit

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budget". The entire rate control algorithm is performed in a pipelined rate control module in an encoder. *Id.* at fig. 9, col. 23: line 7–column 24: line 8.

Regarding Claim 16, in *Uz*, the binary panic mode flag is in a range from 0 to 1, and the scaling, as shown in figure 8A, can vary between no scaling (0) when the VBV is in normal range to complete scaling/clipping (1) when the VBV is out of the normal range.

Regarding Claim 20, in one embodiment of *Uz*, the bit budget for each section of a frame is individually updated as shown in equation 2. The initial bit budget  $BB_i(k)$  for each section is multiplied by complexity measure  $C$ . *Uz*, column 13: lines 16–28. This way, a frame can stay at a complete bit budget while allowing different parts of the image to vary in quality as needed.

Regarding Claim 23, figure 8A of *Uz* illustrates various VBV trajectories. When the VBV level overflows, the bit budget is clipped to bring the VBV level down to under a maximum level. When the VBV level underflows, the bit budget is scaled to bring the actual bit budget closer to the dotted line. When there is no overflow or underflow, the bit budget is left alone.

Regarding Claim 26, in *Uz*, the plurality of buffer anxiety levels are: imminent buffer overflow, imminent buffer underflow, and normal buffer range. As shown in Figure 8A, in case of an imminent buffer overflow, the bit budget is scaled by clipping,

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and in case of an imminent buffer underflow, the bit budget is scaled to bring the buffer fullness level to within normal range.

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 22, 24, 25, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Uz*.

Regarding Claims 22, 24, 25, and 27, the examiner interprets a binary flag in *Uz*, having a range of 0 and 1, indicating a panic mode signaling an imminent buffer overflow or underflow, as equivalent to the claimed scaling relaxation value. *Uz*, column 14: lines 44–48. In conventional terminology, if the panic flag is set to 1, this would indicate a panic mode, and the scaling would be maximized, as shown in figure 8A. If the panic flag is set to 0, this would indicate a normal mode, and scaling would be turned off or left alone. This is opposite of the arrangement in Claims 22, 24, 25, and 27 which present a large relaxation value in range (that is, 1) with a small scaling and a small relaxation value (that is, 0) with a large scaling. However, by instead setting the panic mode indicator in *Uz* as a "no panic" or "normal mode" flag, in conventional terminology, this would produce the claimed results. A normal mode flag of 1 would indicate no scaling, and a normal mode flag of 0 would indicate the maximum scaling or clipping in figure 8A. Since the two methods of *Uz* are mathematically equivalent, the



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claimed determination to control bit rate according to a "relaxation" value instead of a "restriction" value is a mere stylistic, obvious variant.

### ***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent No. 5,682,204 A and U.S. Patent No. 5,872,598 A disclose further aspects of the rate control system of *Uz*. International Publication No. WO 99/57908 A1 discloses scaling different coefficient factors to meet a bit budget.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David N. Werner whose telephone number is (571)272-9662. The examiner can normally be reached on Monday-Friday from 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic

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Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. N. W./

Examiner, Art Unit 2621

/Mehrdad Dastouri/

Supervisory Patent Examiner, Art Unit 2621